

CLAIMS

1. An LED mounting module, comprising:

a substrate; and

5 a reflecting member made of a resin material and having
a reflecting hole in a position corresponding to an LED device
which is to be mounted on one of main surfaces of the substrate,
wherein

10 the substrate and the reflecting member are directly
adhered to each other in such a state that the main surface
of the substrate is in contact with one of main surfaces of
the reflecting member.

2. The LED mounting module of Claim 1, wherein

15 the substrate includes an insulation board made of a resin
material, and a wiring pattern on one of main surfaces of the
insulation board, and

the resin material forming the insulation board contains
a same resin as the resin material forming the reflecting member.

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3. The LED mounting module of Claim 1, wherein

the resin material is a thermosetting resin material

principally containing an epoxy resin.

4. The LED mounting module of Claim 1, wherein

the resin material is a thermoplastic resin material

5 principally containing a resin selected from a group consisting
of a polyphthalamide resin, a liquid crystal polymer, a
polyphenylene sulfide resin, and a polybutylene terephthalate
resin.

10 5. The LED mounting module of Claim 1, wherein

the resin material contains one or more fillers to improve
reflection efficiency.

6. The LED mounting module of Claim 5, wherein

15 the fillers include at least one of TiO_2 , SiO_2 , Al_2O_3 , and
 $BaSO_4$.

7. The LED mounting module of Claim 2, wherein

the resin material forming the insulation board contains
20 at least one of Al_2O_3 , AlN , SiO_2 , and SiC .

8. The LED mounting module of Claim 2, wherein

a metal board is provided on the other main surface of the substrate, and

the resin material forming the insulation board is a composite material containing an inorganic filler and a
5 thermosetting resin material.

9. The LED mounting module of Claim 2, wherein

a metal board is provided on the other main surface of the substrate, and

10 the resin material forming the insulation board is a thermosetting resin material containing a glass fiber.

10. The LED mounting module of Claim 1, wherein

a depression is formed in a part of the substrate at which
15 the reflecting member is adhered, and
the depression is filled with the resin material forming the reflecting member.

11. The LED mounting module of Claim 1, wherein

20 the LED device is one of a plurality of LED devices that are to be mounted on the main surface of the substrate, and
the reflecting hole is one of a plurality of reflecting

holes formed in the reflecting member in correspondence with the plurality of LED devices.

12. The LED mounting module of Claim 1, wherein
5 the substrate includes an insulation board made of a ceramic material, and a wiring pattern on one of main surfaces of the insulation board.

13. The LED mounting module of Claim 12, wherein
10 the ceramic material contains at least one of Al₂O₃, AlN, SiO₂, and SiC.

14. An LED module comprising:

 the LED mounting module defined in Claim 1; and
15 an LED device mounted on the LED mounting module.

16. A manufacturing method of an LED mounting module including a substrate and a reflecting member having a reflecting hole in a position corresponding to an LED device which is to be
20 mounted on one of main surfaces of the substrate, the manufacturing method comprising:

 a formation step of forming a half-cured reflecting member

formed by a resin material in B stage; and

a connection step of placing the half-cured reflecting member on the main surface of the substrate, and completely curing the resin material in B stage while the main surface 5 of the substrate is in contact with a main surface of the half-cured reflecting member which faces the substrate, thereby forming the reflecting member, which is directly adhered to the substrate.

10 16. The manufacturing method of Claim 15, wherein

the reflecting member is made of a thermosetting resin material, and

in the connection step, the substrate and the half-cured reflecting member are heated and applied with pressure while 15 the main surface of the substrate is in contact with the main surface of the half-cured reflecting member.

17. A manufacturing method of an LED module, comprising:

a manufacturing step of manufacturing an LED mounting 20 module, based on the manufacturing method defined in Claim 15; a mounting step of mounting the LED device at a predetermined location on the manufactured LED mounting module;

and

a covering step of covering the mounted LED device with a resin material containing a phosphor powder.

5 18. A manufacturing method of an LED mounting module, comprising:

a substrate formation step of forming a substrate; and
a reflecting member formation step of forming a reflecting member on one of main surfaces of the substrate, the reflecting member being made of a resin material and having a through hole
10 in a position corresponding to an LED device which is to be mounted on the main surface of the substrate, wherein
in the reflecting member formation step, the reflecting member is formed in such a manner that a molding member is placed on the main surface of the substrate, a liquid resin material
15 is injected into a space defined between the molding member and the substrate, and the resin material in the space is cured.

19. The manufacturing method of Claim 18, wherein

a wiring pattern is formed on the main surface of the
20 substrate,

the molding member is formed like a box, and has a protrusion formed on a base in a position corresponding to the LED device

which is to be mounted on the main surface of the substrate,
when the molding member is placed on the substrate, a top
part of the protrusion faces toward the wiring pattern,
a depression is formed in correspondence with the wiring
5 pattern, in the top part of the protrusion,
a width of the depression is larger than a width of the
wiring pattern, by 1 µm to 20 µm, and
a portion of the depression, which corresponds to a portion
of the wiring pattern on which the LED device is to be mounted,
10 has a depth larger than a thickness of the wiring pattern.

20. The manufacturing method of Claim 18, wherein
the liquid resin material is injected under reduced
pressure.

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21. The manufacturing method of Claim 18, wherein
in the reflecting member formation step, after the resin
material in the space is cured, a surface of the cured resin
material which faces away from the substrate is flattened.

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22. The manufacturing method of Claim 18, wherein
in the reflecting member formation step, after the resin

material in the space is cured, flash is removed by spraying particles against the flash.

23. A manufacturing method of an LED module, comprising:

5 a mounting step of mounting an LED device on one of main surfaces of a substrate; and

 a reflecting member formation step of forming a reflecting member on the main surface of the substrate on which the LED device has been mounted, the reflecting member being made of

10 a resin material and having a through hole in a position corresponding to the LED device, wherein

 in the reflecting member formation step, the reflecting member is formed in such a manner that a molding member is placed on the main surface of the substrate, a liquid resin material

15 is injected into a space defined between the molding member and the substrate, and the resin material in the space is cured.

24. The manufacturing method of Claim 23, wherein

20 a wiring pattern is formed on the main surface of the substrate,

 the molding member is formed like a box, and has a protrusion formed on a base in a position corresponding to the LED device

mounted on the main surface of the substrate,

when the molding member is placed on the substrate, a top

part of the protrusion faces toward the wiring pattern,

a depression corresponding to the wiring pattern and a

5 depression corresponding to the LED device are formed in the

top part of the protrusion, and

a width of the depression corresponding to the wiring

pattern is larger than a width of the wiring pattern, by 1 μm

to 20 μm .

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25. The manufacturing method of Claim 23, wherein

the liquid resin material is injected under reduced pressure.

15 26. The manufacturing method of Claim 23, wherein

in the reflecting member formation step, after the resin material in the space is cured, a surface of the cured resin material which faces away from the substrate is flattened.

20 27. The manufacturing method of Claim 23, wherein

in the reflecting member formation step, after the resin material in the space is cured, flash is removed by spraying

particles against the flash.